
Danthonia



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NEWSLETTER OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

Temperate Grassland Project in South Australia

*Vicki-Jo Russell, Threatened Species
Network (SA)*

South Australia's temperate grasslands are on the verge of extinction. The State once had around one million hectares, but less than a third of a percent remains. The remaining grasslands are home to five nationally threatened plants and another 30 species of significance in South Australia.

The World Wide Fund for Nature - Australia (WWF) has funded two major surveys of native grassland and grassland sites in South Australia in the last five years. The second survey, conducted by Michael Hyde and entitled "Temperate Grasslands in South Australia - their composition and conservation status", was recently launched in Adelaide in August and is available for \$25.00 from WWF in Sydney on (02) 299 6636.

In 1994 WWF received funding from the Save the Bush Fund to implement the major recommendations from these two reports. One of the key recommendations was the appointment of grassland extension

officers in each of the major grassland regions to promote conservation of significant remains.

Project Officers will be employed to discuss grassland conservation with a variety of landholders including local councils & owners of private property. Information about native grasslands and their protection will be provided along with assistance with key activities such as planting & protective fencing.

The Officers aim to complement existing programs and provide additional assistance through specialist grassland knowledge. In the first year of the project an Adelaide Project Officer has been appointed for two days a week to increase awareness of grasslands and their values. The Officer will be networking through the State to identify stakeholders and interest groups, to promote the project and to establish an effective framework for the project in future years. In the second and third years of the project, Project Officers will be placed in significant grassland

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National Coordinator's Report

Jeanette Mill

By now you should be aware of the dates for the 1997 conference as a result of the preliminary publicity. The conference organising committee met for three days in Coffs Harbour recently to discuss all the aspects of running the conference. Many local groups are offering assistance, and the ANPC's profile in the region has been lifted considerably by news of the conference.

Contributions for *Danthonia* continue to roll in, and we are always keen to discuss ideas for articles and newsy items, big or small. *Danthonia* is a great way of promoting the Network, so if you know of anybody who would be interested in receiving a complimentary copy, we would be happy to send one.

The Tasmanian Region is further developing the Botanical Guardians scheme, to coordinate those wanting to be more directly involved in recovery work. Promotion of the group's activities should reach many people who may not currently be aware of the ANPC.

The South West Slopes (SWS) of NSW group has been active, with several well attended meetings under its belt. Local groups and individual land managers are joining forces in leading visits to sites of interest on public and private land. A draft form is being trialled to assist with the assessment of sites for their significance. This is proving an effective way of coordinating decisions about management

options for sites. Lists of species found at sites are being augmented.

The success of the SE NSW/ACT group in hosting the establishment of the SWS group has had a snowballing effect. The Sydney region is planning a meeting at Burrendong Arboretum to discuss the idea of a Central Western Slopes of NSW group.

Remember - the ANPC is a network. It is only through contributions from members such as those who write articles, coordinate regional groups, and participate in regional group activities, working groups and organising committees that the work of the ANPC can be achieved. Keep those contributions coming. Oh - and of course don't forget to pay your membership!!

ANPC Advisory Committee

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Dr Tony Brown
Dr Mick Brown
Mr Stephen Harris
Ms Katrina Jenz
Mr Ed McAlister
Ms Margaret Moore
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Danthonia

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regions in South Australia to assist with protection on the ground, hopefully starting in the mid-north region of the State in 1997.

Information packages will be produced in cooperation with other organizations such as the Australian Conservation Foundation and distributed to landowners, stakeholders and tertiary institutions.

If you have an interest in South Australian grasses, would like to get involved or just want to find out more, contact the South Eastern Grassland Project Officer, Threatened Species Network (SA), Vicki-Jo Russell, at 120 Whitfield St Adelaide SA 5001.
Phone: (08) 223 5155.
Fax: (08) 232 4782.



Salinity in Wetlands: Detrimental Effects on the Growth and Development of Ephemeral Wetland Macrophytes

Nigel Warwick and Paul Bailey,
CRC for Freshwater Ecology and
Department of Ecology and
Evolutionary Biology, Monash
University, Victoria

Salinisation of land in SE Australia has received much attention in recent decades, and in particular the effect of salt on the productivity of agricultural land. Occurring in parallel with salinisation of agricultural land is that of wetlands and riverine systems. This is occurring not only because of seepage of saline groundwater into watercourses, but also as a result of pumping of saline water into rivers. Saline groundwater pumping is carried out to maintain saline groundwater tables below depths which will interfere with the root zones of plants.

Wetlands are important for maintaining biodiversity in plants and animals, in removing nutrients from agricultural runoff, providing a habitat for a large number of native birds and animals as well as being a place for recreational activities such as fishing and camping. In the past, wetlands were often seen as places to be drained or to be sacrificed as places to pump saline groundwater. Management techniques need to be developed to minimise the damage salt can do to Australia's wetlands.

For the past four years we have been doing research on wetlands and salinity as the major part of a grant from the Land and Water Resources Research and Development Corporation. The aims of the project are:

- to find out what was known about salt sensitivity of wetland and riverine plants and animals;
- to carry out field and glasshouse studies on the effect of increasing salinity on wetland plants and animals;
- to formulate tentative management regimes which would help land resource managers to minimise the damage to wetlands of increasing salinity.

To study the effects of increasing salinity on wetland biota, the Raftery State Forest Wetland, near Shepparton in Victoria, was selected. Raftery's is an ephemeral wetland which floods for between four to eight months a year. The wetland is currently unaffected by salt and therefore the plants and animals are not adapted to salinity. Two distinct phases are observed during the year - a 'dry phase' during which the wetland has a sward of *Amphibromus fluitans* (Graceful Swamp Wallaby Grass) and introduced weeds, and then a 'wet phase' after flooding which can occur in any month from July to September. *Triglochin procera* (Water Ribbons), *Potamogeton tricarlinatus* (Floating Pondweed), *Eleocharis acuta* (Common Spikerush) and *Myriophyllum crispatum* (Water Milfoil), which lie dormant over the dry phase, emerge and grow rapidly, flower and set seed. *T. procera* and *P. tricarlinatus* also form new

underground tubers, in which they store energy and nutrients for regrowth when the wetland refloods the following year.

The groundwater in the Goulburn Valley ranges in salinity from 2 to 10 grams per litre (g/l), the majority being approximately 2 g/l with about 25% about 6 g/l. Therefore in our experiments we have used 2 g/l and 6 g/l sodium chloride as concentrations likely to be experienced by the wetland should it be either inundated with rising groundwater tables or flooded with saline water pumped into the river system. To allow us to apply the different salinity treatments to the wetland, during the dry phase we constructed 10 by 10 metre enclosures 50 cm high lined with plastic sheets. The plastic skirts lay flat on the ground until the wetland flooded when they were pulled up. The wetland floods to a depth of about 1 m and then drops over the next 20 days to around 50 cm. The loss of water is then predominantly evaporation driven. Salt could then be added to the enclosures to bring them to the desired concentration. Over the wet phase measurements were made of salinity levels, plant growth and insect and other animal numbers. Further experiments were carried out in the laboratory and glasshouse to refine the effects of salt on these plants and animals.

As wetlands contain a range of plant and animal species, it was expected that there would be a range of responses to salt. *A. fluitans* was unaffected by salt whereas *P. tricarinatus* and *M. crispatum* both showed significant reductions in

growth. The number of remnant shoots and root biomass of *M. crispatum* were found to be significantly reduced by salinity at the end of the wet phase. The remnant shoots and root biomass are the propagules from which new growth arises in the subsequent flooding. *T. procera* is more tolerant as a fully grown plant but it is sensitive at the seedling stage. Field and greenhouse experiments have shown that salt levels of around 6 g/l can prevent the development of reproductive structures. Not only do plants such as *P. tricarinatus* grow weakly in 6 g/l but the formation of tubers necessary for growth in the following year is prevented. Measurements in the field after the wet phase indicated a two-thirds decrease in storage tubers in the soil. Lower levels of salinity reduce growth, but not as drastically. Flowering can also be completely prevented in *P. tricarinatus* by salt levels above 2-3 g/l. Glasshouse studies have shown that damage can be reduced by delaying the time of exposure to salt in *P. tricarinatus* until after the plant has been able to grow and initiate its storage tubers.

A factor which must be considered when these ephemeral wetlands flood is that while the initial salinity of the water which flows in may be low, as the wetland dries out the salinities can reach very high levels. For example, a wetland with a salinity of 2 g/l can reach 6 g/l by the end of the summer.

We now have a better idea for some of the wetland species of the Murray-Darling Basin as to how plants and

animals are affected by salt and we are now formulating tentative strategies which will minimise damage by salt.

- The simplest would be to avoid disposal of water to rivers when ephemeral wetland flooding is likely.

- At a more sophisticated level, consideration should be made of the reproductive stages of wetland plants and avoiding disposal of saline water to rivers above concentrations which will damage sensitive growth stages such as flowering or tuber formation. This could be simply assessed by visiting local wetlands and looking at whether flowers have appeared and seeds have set or by digging around in the wetland to see if storage tubers have formed for the growing season. It may then be safer to inundate the wetland with saline water.

- Water managers should always be aware that the salt concentration of the water they send into the river may treble or quadruple during the drying phase of ephemeral wetlands.

Through this work we have been able to more clearly understand the factors contributing to the loss of wetland vegetation and animals. However, this work has concentrated on a particular wetland type. Whilst the management principles may apply to other wetland types, more need to be studied. Most importantly, further research is needed which ties in with real management decisions on disposal of saline water to rivers and wetlands. Studies need to be made on saline water disposal areas which can monitor plant and animal growth after applying real

saline disposal options. In this way, we can more effectively determine what effect these management decisions have and from this find ways to minimise the damage that salt will do to Australia's wetlands.



Course

Biodiversity in the 21st Century

20 November 1996: At Macquarie University, NSW. From 9 to 2, it gives an overview of biodiversity assessment techniques.

Note: A full workshop, **Techniques in Biodiversity Assessment**, will be held from 20-22 November.

Deadlines: short course 13 November, workshop 30 September earlybird, 13 November late.

Contact: Robyn Delves.

Phone: (029) 850 8153.

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rdelves@rma.bio.mq.edu.au

Activities of the Threatened Plant Action Group in South Australia

Tim Reynolds

The Threatened Plant Action Group (TPAG) was formed at a meeting in Adelaide on 9 November 1993. It was formed in recognition of the need to initiate key recovery actions for populations of nationally threatened plant species in South Australia currently lacking adequate conservation management. A steering committee was formed on 25 January 1994 to determine directions and future priorities for action.

TPAG operates under the auspices of the Threatened Species Network (TSN (SA)) and is affiliated with the Stirling Threatened Plant Action Group and the Victor Harbor Biodiversity Action Group. The steering committee meets periodically to discuss priorities for action and involvement for the Group.

Since 1993 TPAG has been involved in a wide range of field projects involving 18 nationally threatened taxa. All projects involve close liaison and collaboration with land managers (e.g. National Parks and Wildlife Service, councils) and many were initiated by this Group. A number of projects have also involved collaboration with Friends of Parks groups, other community groups such as the Native Orchid Society of SA, and a range of government agencies.

TPAG reports on recent and up-coming activities in *The Networker*, the newsletter

of the Threatened Species Network, which is distributed to all TSN (SA) members bimonthly. TPAG has a diverse membership including professional botanists, amateur naturalists and a range of people highly skilled in bushland rehabilitation.

Functions

With the main focus on nationally threatened plant species in South Australia, the primary functions of TPAG include:

- identifying project priorities for recovery action
- developing recovery action plans
- initiating and implementing recovery action plans
- liaising with other groups and organisations concerned with threatened plant conservation
- facilitating and coordinating recovery programs with other groups
- disseminating information to land managers
- promoting public awareness.

Some current projects

Below are some of the recovery projects in which the Group is currently involved:

***Pterosylis cucullata* (Leafy Green-hood Orchid)**

Rating: Vulnerable (Aus). The largest and most viable known populations of this orchid occur in Belair National Park in the Mount Lofty Ranges near Adelaide. Three populations have apparently become extinct within the park since the 1950s indicating the need to undertake recovery work. Many parts of the Park have been invaded by an extensive suite of herbaceous

and woody weeds, and the increasing use of the park by horse riders is likely to exacerbate the impact on the habitat of this orchid. TPAG has contributed many hundreds of person-hours within the Park to the removal of weeds such as sweet pitosporum, olive, boneseed, Montpellier broom and bridal creeper using minimal disturbance techniques, and has strongly opposed the recent opening of a horse-trail through one of the main *Pterostylis cucullata* populations.



Leafy Greenhood Orchid
Pterostylis cucullata

***Agrostis limitanea* (Perennial Blown Grass)**

Rating: Endangered (Aus). A small council reserve near Spalding in the Mid-North is the only known location of this species. TPAG has successfully negotiated with the District Council of Spalding and the Department of Environment and Natural Resources to have this site fenced to protect the population from

kangaroos and travelling stock. A number of field trips have been made to this site to monitor the population, remove weed competition (particularly *Phalaris*) and to clear a fenceline. This project has involved members of the small local community and the district council. Future work will include further searching for new populations.

***Psoralea parva* (Small Scurf-pea)**

Rating: Vulnerable (Aus). Two small relict populations of this species occur within a reservoir reserve in metropolitan Adelaide and are recognised as the only remaining populations on the Adelaide Plain. Threats to one population of 14 plants were identified as competition from weeds and exotic pines, and inadvertent damage by grounds maintenance staff. TPAG is monitoring this population and has removed much of the weed competition. Rocla Quarry Industries has supported the Group's efforts by donating fencing materials and erecting a fence around the population.

***Caladenia rigida* (Rigid White Spider Orchid)**

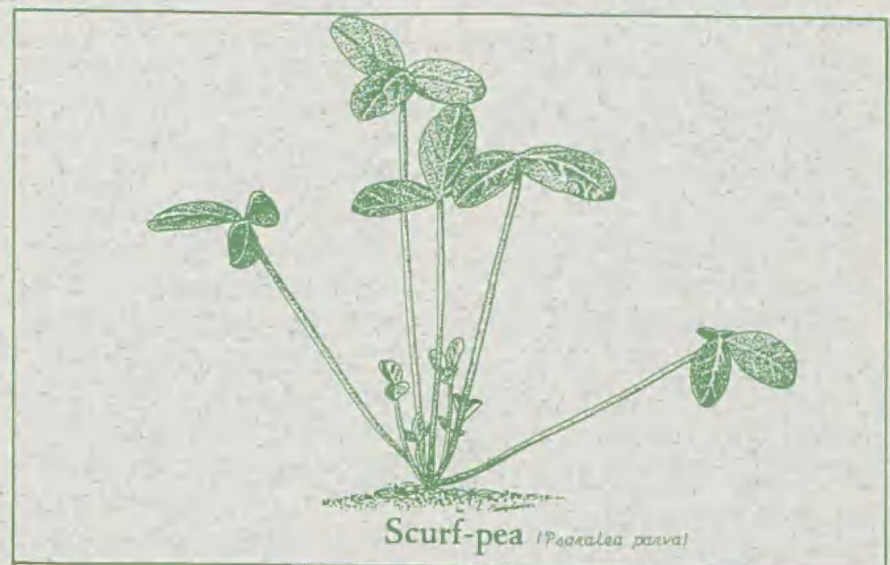
Rating: Endangered (Aus). The largest known population of this orchid occurs in a reservoir reserve in the southern Mt Lofty Ranges near Adelaide. The immediate threat to the population, a dense infestation of European gorse, has been removed by members of TPAG. The population size has been revised upwards since work began at this site and monitoring is continuing.

Future operation

TPAG receives no recurrent funding for its activities and despite a limited membership base the Group is involved in 18 threatened species recovery projects. All activities are carried out with donated labour and materials. The emphasis of the Group's function is action and accordingly members devote the majority of their efforts to on-site recovery activities.

Given the Group's limited resources, future operation will need to focus increasingly on facilitating and coordinating projects and disseminating

(continued page 7)



Scurf-pea *Psoralea parva*

information to land managers. The need to disseminate information to land managers including NPWS staff has been identified as a key area concerning threatened plant conservation in this State.

(Editor: The contact for TPAG is Vicki-Jo Russell, at 120 Whitfield St Adelaide SA 5001.

Phone: (08) 223 5155.

Fax: (08) 232 4782.

Thanks to Vicki-Jo for the fine artwork by Lois Padgham).

The Understorey Network of Tasmania

Warner Wait, President

The inaugural meeting of the Understorey Network was held in December 1994 at Bonney Plains, the home of Biz Nicholson. Representatives from the Society for Growing Australian Plants, private forestry, Greening Australia, the Hobart City Council and various nurseries, and others, attended this meeting, which generated the motivation to develop the Network further.

In May 1995, Biz Nicholson and Els Hayward travelled to Adelaide to study the Trees for Life program. This was developed in South Australia a few years ago and has had tremendous success. Its basis is to access propagators who are willing to grow trees in a very simple way for farming communities throughout the state.

While the structure and concept of our Network is very

similar to "Trees for Life", we propose to focus more on the propagation of understorey plants, ie the layer of plants which naturally occur under the trees of a forest or woodland. This includes grasses, vines, creepers, ferns, seedlings, sedges, shrubs and small trees. This understorey protects the ground from erosion and sunlight, accommodates insect and animal life and makes the land more fertile.

Network aims are:

- raise awareness in the general community about the value of understorey plants
- collect seeds of understorey plants
- disseminate propagation assistance, information and plant material to a wide range of users including farmers and community, industry and research groups
- plan field days, workshops and seminars
- provide encouragement and follow up support to individuals and organisations
- record vital information about existing plant communities on a database, and
- encourage retention of plant communities and promote the use of understorey plants in revegetation.

During the last 12 months the Understorey Network has generated a lot of interest in the community, with over 200 offers of help from people around the State. Last September we obtained a Landcare grant to develop the Network further. This enabled us to employ a part-time

Coordinator, Anna Povey. Her role is to coordinate various district group leaders and assist them with seed collecting and storage, prepare a database from district plant surveys, oversee the distribution of soil mix, pots and seeds, and promote the Network through the preparation of information leaflets and posters and by advertising on local radio and at community shows.

District Leaders also help with the dissemination of information by making themselves available to attend Landcare meetings and hold talks and discussions with interested parties. Greening Australia have been most helpful by attending our field days and assisting with the education of propagators, and by passing on valuable information from their plant survey work.

At our first Annual General Meeting, we formed an official Working Committee and adopted a Constitution, which clearly sets out the aims and objectives of the Understorey Network. The following AGM saw myself elected as the new President, Els Hayward as Vice President and Naomi Lawrence as Secretary. Anna Povey remains the Coordinator, and we have submitted an application for funding to employ her full-time.

With the continued support of private forestry, Greening Australia, Landcare, the Tasmanian Conservation Trust and the Society for Growing Australian Plants, we look forward to further expanding the Network and achieving many of our goals.

For further information, please contact the Coordinator, Anna Povey, on phone and fax (03) 6334 6633.

Database of Queensland's Rare and Threatened Flora and Fauna

Gwyn and Sandra Griffith

During the course of our work for the Community Biodiversity Network, we have established and maintain a database of the rare and threatened flora and fauna of Queensland.

The database contains information pertaining to all plants and animals that are classified as Presumed Extinct, Endangered, Vulnerable, Rare or Common according to Queensland's Nature Conservation Act 1992 and the Nature Conservation (Wildlife) Regulation (1994). There are some 300 animals and 1150 plants in the system. It is intended to add other species of conservation interest to the database as required.

The primary purpose of the database is to enable species noted in the legislation to be linked to particular shires or other geographical regions (although other types of queries can also be answered) and to produce brief details about any species on demand.

The database is relational, that is, it contains data about various aspects of the species, their habitats etc, and the geography of Queensland, in a series of tables which can be updated independently but which are also related (linked) to each other. These links can be utilised to answer queries based on the relationships

between the sets of information in the database eg What species which are both Endangered and Rare might live in the Shires of Belyando and Jericho?

The database has been designed in five modules using Microsoft's Access V2.00 software. Three of these contain data tables while the other two contain the input form, query and report designs which enable information to be entered into and extracted from the database. Queensland has been divided into 18,100 cells, 10 kilometres square, for each of which the shire name, biogeographic region, the pastoral district and other information has been recorded from 1:2 000 000 scale maps. It is envisaged that in future Queensland's ecosystems and their conservation status will be added to the cell data. The cell system for handling the geographic information might eventually be replaced by a more flexible geographical information handling system such as Mapinfo.

For each species the following basic information has been recorded: scientific name, common name, phylum, class, family, conservation status (under Queensland Legislation, Federal Legislation, CITES, the World Conservation Union and ANZECC schedules) and geographical distribution (by Shire, biogeographic region, pastoral district, and alpha numeric grid reference). Also included are brief details pertaining to threats, habitat, food sources, range, the availability of propagation material etc. and information about action plans, recovery plans, project funding and the people and organisations involved with these. The names and page references of books

used are given for each species.

Many references were used in compiling the database, including ANPC publications. Various individuals from a number of organisations, in particular the Queensland Herbarium and the Queensland Museum, provided help which was much appreciated.

The flora and fauna entered into the data base were taken directly from the appropriate schedules in the Queensland legislation as it was first promulgated. Since then there have been amendments to these schedules which are now being incorporated into the database.

The accuracy of the geographical distribution information contained in the database is of course dependant on the accuracy and nature of the data contained in the sources which we used.

For fauna, the geographical distribution was obtained primarily from **An Atlas of Queensland's Frogs, Reptiles, Birds and Mammals**, edited by Glen J. Ingram and Robert J. Raven, published in 1991. For the flora, the primary reference was **Rare and Threatened Plants of Queensland Second Edition**, by M.O.B. Thomas and W.J.F. McDonald, published in 1989.

We recognise that the procedures we use to assign locational data to each species are subject to a number of limitations, such as lack of data. However, we have adopted a policy of trying to produce lists of all species which might live in a specified region, erring on the generous side when in doubt, rather than lists of species which definitely exist in that region. It is essential for those making use

of the database to be made aware of its limitations. Ideally, when data input has been completed and checked, we would like the information to be reviewed by professional botanists and zoologists.

Information from the data base is freely available to communities, conservation groups and commercial ventures, including, of course, members of ANPC.

We are also working on another Community Biodiversity project called P.A.W.S. (Plant & Wildlife System). P.A.W.S. is a data base containing information on the relationships between animals, plants and humans. It takes a holistic view of the Blackall Range, with landholders monitoring the wildlife on their own properties and getting to know their piece of the earth by heart. It was designed with a view to eventually producing a CD-ROM of the design, which could then be used by other communities to paint their own wildlife picture.

Our work for the Community Biodiversity Network is community based, with our primary aim being conservation of biodiversity. We liaise with other conservation groups, including the Sunshine Coast Environment Council, Landcare Groups, the Queensland Conservation Council, the National Threatened Species Network, the ANPC, other community groups and commercial ventures.

We can be contacted at any time at 6 Peppertree Close, Marcus Beach, QLD 4573.

Phone: (074) 48 2072.

Fax: (074) 48 2360.

Email: feral@peg.apc.org

Database Information

If you have a conservation database which you would like to tell others about, why not send us an article about it for *Danthonia*?

Use the mailing address on page two, and send a hard copy, or send it on disc in Text



Conferences

Earthlinks '97

13 January 1997: University of Tasmania, Hobart, Tasmania. An Australian Association of Environmental Education and the Marine Education Society of Australasia conference.

Theme: bringing people together to explore ways of reconnecting with the earth. The main foci are Eco Links, Education System Links, Cultural and Global Links and Community Education Links.

Contact Nel Smit, Education Programs, Department of Education, GPO Box 919 Hobart Tasmania 7001.

Phone: (002) 337 725.

Fax: (002) 336 980.

Email: cs_nel@ecc.tased.edu.au

Living Grasslands of Canberra & the South East Region

9-10 November 1996: At the Theatrette, Australian National Botanic Gardens, Canberra. A Friends of Grasslands (FOG) conference, it is for anyone interested in grasslands and community management.

It will coincide with the peak flowering and diversity season for native grasslands. There will be speakers, identification and biodiversity assessment, and field trips.

Costs: \$50, or \$25 per day, and an optional banquet on Saturday 9th for \$20. Papers for those not attending will cost \$20.

For further information, contact Sandy Kay (FOG).
Phone: (062) 253 3320.

Using Environmental Consultants: Reality and Potential

14-16 October 1996: At the Australian Mineral Foundation, Glenside SA 5065. Environment Institute of Australia (EIA) 1996 National Conference.

Key issues include ethics in environmental management, networks and working with consultants.

Speakers include academics, consultants, engineers, lawyers, government officers, and accountants.

Registration inquiries to Sally Jay Conferences, 23 Westbury St, Hackney SA 5069.

Phone/fax: (08) 362 0038.

Program inquiries to Mary Lou Morris, EIA.

Phone/fax: (08) 362 80656.

Alice Springs Desert Park - Australia's First Biopark

Mark Richardson, Curator
Botany, Alice Springs Desert
Park

A unique natural history facility is currently being established near Alice Springs in the arid centre of Australia. It is combining plants, animals and Aboriginal culture to introduce visitors to the Australian desert environment. It is the most significant development that has ever occurred in terms of the promotion of Australia's desert flora and fauna. The need for the conservation of these plants and animals will form an important part of this promotion. The facility will not only be concerned with education but also research, with the Alice Springs Herbarium being relocated to the Park.

The Park is located on the outskirts of Alice Springs in central Australia. It will be first opened to the public in March 1997.

The Park covers about 1300 ha and includes an impressive portion of the Macdonnell Ranges that rise above the surrounding plains. The main exhibits are within the core area of the park which covers about 40ha. This area is located on the plains to the north of the range. The dominant plant species occurring naturally on the core site include *Acacia kempeana* (Witchetty Bush - source of the famous witchetty grub), *Acacia estrophiolata* (Ironwood), *Atalaya hemiglauca* (Whitewood), *Hakea suberea*

(Corkwood), *Acacia aneura* (Mulga) and one of the icons of central Australia, the Ghost Gum (*Corymbia aperrerinja* - formerly *Eucalyptus papuana*). Spinifex does not occur naturally within the core site but two species (*Triodia clelandii* and *Triodia longiceps*) occur within the park.

The Park's goals are:

1. to increase visitor appreciation, understanding and enjoyment of the arid region in Australia.
2. to provide a facility for the conservation of flora and fauna for the region.
3. to interpret Aboriginal use of desert plants and animals.
4. to provide a unique recreational opportunity for local residents and visitors.
5. to facilitate scientific research into the natural history and environment of arid Australia.

Some \$24 million dollars have been allocated to this project and it will be developed in two stages. Stage 1, the most expensive, has included the development of the first

three habitats, the visitor centre, the nocturnal house and the nature theatre. The first three habitats are riverine, sand country (including a clay pan, gypsum pan and salt pan) and woodland. Stage 2 is planned to finish in the year 2000. It will include the development of the remaining habitats and associated aviaries and other animal exhibits. These are ranges, gorges, mulga, gibber and mitchell grass.

Unlike the situation in most zoos, the plants at the Desert Park will not be just background for the animals. Rather the animal displays will encapsulate a part of the habitat that is being portrayed. The plantings of the habitats will flow through the animal exhibits unimpeded (albeit a little bit chewed).

It is intended that all the plants within the core area will have known and, in the main, wild origin. It is also intended that these plants will be vouchered at the Alice Springs Herbarium. To help enforce this the plants will be given accession numbers that are based on the number given for



Early landscaping of one of the riverine aviaries

the Herbarium specimen. There will, however, have to be temporary numbers given for some (e.g. seed from other institutions) as voucher specimens will have to be collected after propagation or cultivation.

As the living collection is being developed so are the recording procedures. The plant database is being developed in conjunction with the Darwin Botanic Gardens, the Northern Territory Herbarium and other parts of the Parks and Wildlife Commission. In addition alternatives are being considered for the mapping of the plants within the various habitats. At present the most favoured will involve the use of GPS technology including the establishment of a base station within the Park to allow rapidly processed sub metre accuracies for the Park and also a useful service for other National Parks up to 500 km from Alice Springs. To continue the integration within the Park, the records for both plants and animals will be managed by the same person who will be part of the Botany section.

The Park is administered by the Northern Territory's Parks and Wildlife Commission. A second wildlife park, namely the Territory Wildlife Park, is also administered by the Commission and is about 50 km from Darwin. It was established in the 1980s and is principally concerned with the flora and fauna of the Top End.

It is hoped that the Park will be among the first places visited by people coming to Australia's arid centre. All too



Aboriginal guide helping with the first planting

often the desert is viewed as empty and visitors travelling through it think more about their destination than the landscape through which they are passing. The changes in the landscape and the often cryptic nature of the plants and animals is not appreciated and much that would be of interest is missed. The Park will hopefully help to prepare visitors for the environment that they have entered - to get them to slow down and look around.

Unlike most similar facilities including most botanic gardens and zoos, the links that the Park has with the Northern Territory's Parks and Wildlife Commission mean that the 'story' does not have to end at the exit. It is intended that visitors will view the Park as a microcosm of the larger desert environment and an introduction to the many desert National Parks and reserves. To assist with the interpretation of the displays, the Park will also be employing education and interpretation staff as well as both Aboriginal and non-Aboriginal guides.

At present there are six staff in the Botany section and four in the Zoology section. By the end of the year it is intended to have increased those numbers to 11 and 14 respectively. As the botanical and zoological activities are to be integrated as closely as possible, it is vital for the staff of the respective areas to have a good understanding of their counterparts' activities.

While the main priorities for the botanical section for the next few years will be to develop the living collection and landscape the displays, many of the staff will need to learn about animal behaviour to assist in the landscaping work.

In the words of the Master Plan prepared for the Northern Territory Government in 1994, "the Alice Springs Desert Park will be the premier educational facility in Australia for displaying and interpreting life in Australian desert ecosystems. The Park will interpret the arid regions of Australia which includes the central 70% of the continent. Surrounded by a

vigorous indigenous culture and a magnificent environment, the Park will break new ground in the display and interpretation of the traditional use of plants and animals by aboriginal people. The Park will provide an uncommon opportunity for aboriginal and non-aboriginal people to pursue a common goal and to build a cross cultural awareness and appreciation. The lead role taken by aboriginal people in presenting ethnobotanical themes will be an essential element of this process. Through its living collection of plants and animals, the Park will foster research, management and conservation of the natural environment."

(Editor: Thanks to Mark Richardson for the photographs).



A leaf of the Wollemi Pine

Conserving The Wollemi Pine: An Integrated Approach

Cathy Offord, Mount Annan
Botanic Garden, NSW

It seems that new species are being discovered, or rediscovered, all the time. Seldom, however, does a discovery create the interest aroused by the chance finding of the Wollemi Pine (*Wollemia nobilis* Jones, Hill and Allen) by David Noble in late 1994 (Jones et al 1995).

Much has been said in the world media, from the front page of daily tabloids screaming sensational headlines about rediscovered dinosaur trees (the 'Pinosaur'), to excellent treatments by scientific programs such as Quantum. Letters and phone calls requesting information, propagation material and visits to the site have been flooding in. This sort of interest is inevitable: conifers are beloved worldwide, and this new, monotypic genus is a living representative of a line widespread in the Jurassic to Cretaceous period (200-65 million years ago) (Hill 1996) which was thought to be extinct. Leaf, branch and scale fossils of similar species have been found in various deposits in Australia and other land masses that were originally part of the Gondwanan supercontinent, and a mystery pollen fossil - *Dillwynites granulosa* - dated to about 91 million years ago, is an exact match for Wollemi Pine pollen (McPhail et al 1995).

A Memorandum of Understanding (MOU), developed

between the NSW National Parks and Wildlife Service and the Royal Botanic Gardens Sydney (RBG - incorporating Mount Annan and Mount Tomah gardens), aims to secure the integrity of the two natural populations which comprise less than 40 adult trees and a few hundred mostly moribund seedlings. The approach to the Wollemi Pine's conservation is integrated, a cooperation of field officers, scientists and managers encapsulated in the forthcoming 'Recovery Plan' (ANCA 1996). For this species however, the term 'Recovery Plan' is somewhat of a misnomer and should be regarded more as a 'Plan of Management', as there has been little damage caused by humans, but a great deal of threat from future intervention (Benson 1996).

The simple act of visiting the site poses one of the greatest threats. The area is extremely fragile, the soil shallow and poised on slopes and ledges. In many areas around the trees, roots are exposed and small seedlings nestle. As it is, few of these seedlings seem to attain adulthood (for reasons that can only be conjectured upon as yet) and it is certain that trampling and subsequent soil compaction or loss will further aid their decline. Soil-borne diseases such as the disastrous *Phytophthora* could easily be brought in by the unwitting, on shoes, or even in the soil that accumulates in the bottom of a backpack. Aggressive weed seeds could be brought in just as easily. Bushfires also pose a potential threat as no Australian needs reminding. Reports of unauthorised site

visitors raise concern, as however well meaning or careful they are, it is the accumulated effect of traffic through the area which poses a most insidious threat. Of greater concern is the threat imposed by those wishing to souvenir or collect material illegally for propagation (this is prosecutable under the new NSW Threatened Species Conservation Act).

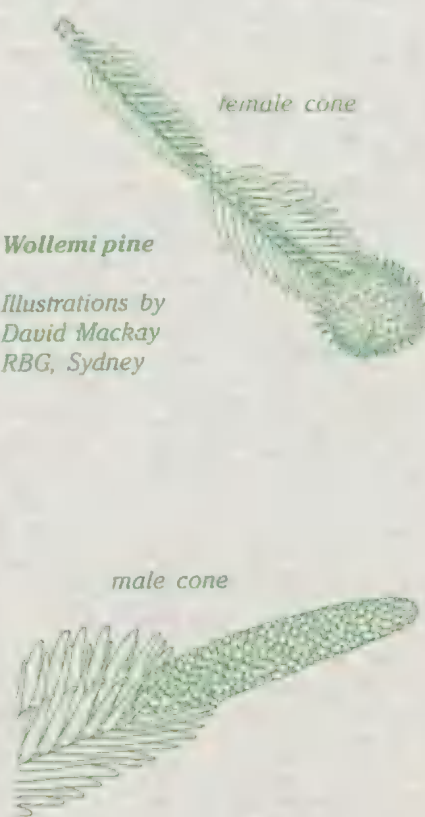
A number of strategies are being followed in the development of the plan of management in order to mitigate against these threats. The location is being kept a relative secret and those who do know are asked not to visit the sites for all the reasons given above. Whilst the long term management of the site is being devised, much research is being pursued on the Pine's horticulture, genetics, ecology, botany and mycology, by a multidisciplinary team from within the NPWS and RBC with national and international collaborators (Hill 1996, Offord 1996). Scientific visits to the site are rare and strictly controlled with predetermined aims and as few personnel as practicable.

Horticultural establishment is one conservation strategy. The work carried out at Mount Annan Botanic Garden has the two-fold aim of establishing an ex situ population and facilitating the widespread establishment of the Wollemi Pine as a garden and amenity horticulture species. The establishment of an ex situ population allows us to continue investigating the biology of the species without further disturbing the natural site. Current work includes study of microbial interactions

with the trees, particularly the interaction with mycorrhizal fungi and serious plant pathogens such as *Phytophthora* spp, as well as plant anatomy and development. The ex situ population is also insurance against the loss of the natural populations, should there be some catastrophe, recognising that it could never adequately substitute for the real populations that have receded over the ages to their very finely balanced habitats.

Wollemi pine

Illustrations by David Mackay RBG, Sydney



Controlled release of plant material of the Wollemi Pine will circumvent the need for illegal and possibly damaging harvesting of seeds and cuttings from the natural populations. Large scale seed harvesting is not possible for this species as there are so few

seed produced.

Plant production by vegetative means has great potential but it will be a number of years before the research phase is completed and stock has been built up in sufficient numbers. Media reports of imminent release are exaggerated and wishful thinking on their behalf.

We have encountered a number of interesting challenges during our research so far. Most of the putative trees from both sites have been cloned by propagating vegetative cuttings. In the wild, Wollemi Pine trees have a multitrunked habit, usually with one to four dominant trunks with girths of half a metre or more. There may be over 100 other smaller trunks or shoots arising from main trunks, at or below soil level. To complicate matters, seedlings often grow around the base of the trees. Therefore, it is difficult to determine what actually constitutes an individual tree, and DNA from cloned plants in the ex situ collection is being tested in various ways to differentiate between individuals. So far, in preliminary work, little difference has been detected, and very sophisticated techniques are being used to elucidate what variation there may be (R. Peakall ANU pers. comm.). The growth habit of the trees, and the very small area which they inhabit, might indicate that the gene pool of the species is extremely small, perhaps as small as only one or two individuals at each site, similar to the Huon Pine population at Mount Read, Tasmania (Shapcott 1996).

Wollemi Pines have also been raised from seed. Seed is

very difficult to obtain: our first and most informative collection was made by helicopter, an exercise not for the faint-hearted, especially in a narrow canyon. The intact cones obtained appear to have less than 10% viable seed, giving less than 20 seeds per cone. This percentage may vary with season and tree.

To collect seeds in the last season, we used a number of large nets suspended under the trees. This system minimises disturbance around the trees and has collected seed and other material for further investigation. This year we obtained sufficient seed to conduct studies on basic seed germination as well as long-term storage requirements. Subsequent experiments will concentrate on light and soil factors to investigate seedling mortality and to maximise growth for horticultural applications. Away from the confines of the gorge, the plant seems to thrive under best practice horticulture including good nutrition, water and adequate light. Not surprisingly, light seems to be a major factor in the growth of the Wollemi Pine and there is much competition in the canyon from warm temperate rainforest species such as Coachwood (*Ceratopetalum apetalum*) and Sassafras (*Doryphora sassafras*).

The retraction of the Wollemi Pine to two small populations in a deep remote canyon is a microcosm of the decline of the great conifers and the subsequent dominance of the flowering trees in the Cretaceous-Tertiary period. We now have a remnant from the age of dinosaurs, perched precariously on the brink of

our largest metropolitan area and subject to the vagaries of the human race.

References:

ANCA (1996). *Wollemi Pine Recovery Plan* (in press), Australian Nature Conservation Agency, Canberra.

Benson, J. (1996). Threatened by discovery: research and management of the Wollemi Pine, *Wollemia nobilis* Jones, Hill and Allen. *Proceedings of Back from the Brink Conference, ANCA* (in press).

*Hill, K. (1996). The Wollemi Pine. *The Gardens* (Newsletter of the Friends of the Royal Botanic Gardens Sydney). 27, 8-9.

*Jones, W.G, Hill, K.D., Allen, J.M. (1995). *Wollemia nobilis*, a new living Australian genus in the Araucariaceae. *Telopea* 6(2-3), 173-176.

McPhail, M., Hill, K., Partridge, A., Truswell, E., Foster, C. (1995). Wollemi pine - old fossil records for a newly discovered genus of gymnosperm. *Geology Today* 11(2), 48-49.

*Offord, C. (1996). Horticultural Research on the Wollemi Pine. *The Gardens* (Newsletter of the Friends of the Royal Botanic Gardens Sydney). 27, 9-10.

Shapcott, A. (1996). A Huon Pine Story. *Danthonia* 4(3), 3-4.

*Reprints are available from the RBG Sydney.

The illustrations are taken from *On The Brink* No 6 January 1995, published by the Endangered Species Program, Australian Nature Conservation Agency, GPO Box 636, Canberra ACT.

Publications of Interest

Biodiversity: Australia's Living Wealth. 1996. Andrew Beattie, ed. Sydney: Reed Books in association with Macquarie University and with assistance from the Commonwealth Department of Environment, Sport and Territories.

The book sets out to explain for non-scientists the meaning and importance of biodiversity. It looks at biodiversity, its origins, flora and fauna, the value of bioresources, world and Australian biodiversity patterns, biodiversity management and more. There are many colour photographs and sketches.

Rescuing remnants : an environmental education program to heighten community awareness of bushland remnants through the schools. 1993. Iris Flenady & Ros Woodburn. 2nd ed. Gold Coast, Qld: Gold Coast North School Support Centre.

Balancing the scales : guidelines for increasing biodiversity's chances through bioregional management. 1996. Kenton R. Miller. World Resources Institute.

Future nature : a vision for conservation. 1996. W.M. Adams. London : Earthscan Publications. An exploration of the links between nature & culture, & the scientific, cultural & economic significance of conservation.

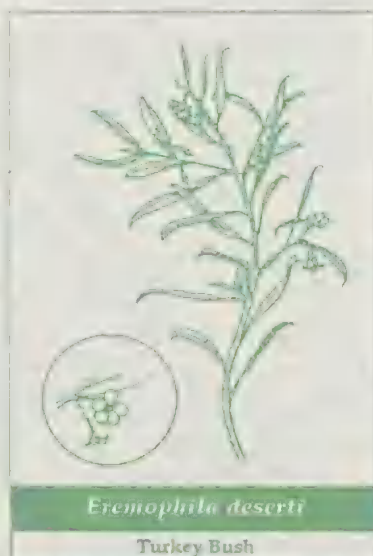
Emu Aids Propagation of Rare Species: *Eremophila desertii*, the Turkey Bush

Warwick Lang, Horticulturist at Werribee Zoo, Victoria

The rare species *Eremophila desertii* is classified as threatened in Victoria. Until the recent discovery near the Werribee River, the species was thought to occur only at two sites, both being over 50 kilometres from the newly discovered population. The Turkey Bush is an erect open shrub with narrow green leaves, growing to approximately two metres high by two metres wide and bearing small white bell-shaped flowers which are followed by creamy yellow berries that darken with age. Fruits of the turkey bush are sweet to the taste, are eaten by birds and were once eaten by the local koories.

Two individual plants are all that constitute the Werribee River population with one plant being ten to fifteen years of age and the other much older at forty to fifty years. The location of the plants is on the lip of an escarpment which slopes steeply down to the floodplain of the Werribee River and has a westerly to south westerly facing aspect. They are overshadowed by non-endemic Sugar Gums (*Eucalyptus cladocalyx*) and surrounded by introduced vegetation such as Boxthorn (*Lycium ferocissimum*) and Peppercorn (*Schinus molle*). Rainfall in the area is 500 mm per annum and the soil at the

site is a heavy red clay which drains freely at the top of the escarpment.



A decision was made immediately to attempt propagation, with 78 cuttings in semi-hardwood form taken from the two available specimens on the 17th January 1996. Debco propagation mix #63007/9 was the chosen medium on a heat bed set at 25 degrees C surrounded by a foam frame with a perspex lid. Cuttings were prepared in a variety of ways ranging in length from six to twelve cm. Variations in the cutting preparation included heeled and unheeled, tipped and untipped, leaves reduced and leaves whole both with and without hormone. The hormone used was a mixture of Naphthalene Acetic Acid (NAA) and Indole Acetic Acid (IAA). The cuttings were misted regularly and thoroughly watered weekly. Roots were sighted at the drainage holes on the 28th of February 1996 and eleven rooted cuttings were potted

into three inch pots on the 9th of March 1996. The longer cuttings that were tipped with reduced leaves did best, but the hormones seemed to play little part in the success of the cutting.

Propagation using seed of *Eremophila desertii* has to date been unsuccessful, as far as I could ascertain, as the fleshy part of the berry contains a germination inhibitor which is imprinted on the seed as the flesh dehydrates. Undeterred, we collected 280 seeds as soon as they were ripe. They were separated into two lots, one consisting of 100 seeds and the other lot the remaining 180 seeds. The first lot was soaked in water for two months then sown on the 10th of April 1996. By the 10th of August 1996 no seedling had appeared. With the second lot of 180 seeds, a different method was attempted. While still fresh the seeds were fed to an emu. After two days the droppings were gathered and sorted through to retrieve the seeds which were then soaked in water for as long as the first lot. Upon removal from the water they were sown and at the writing of this article several seedlings have germinated and have been potted up.

The seedlings produced, along with the cutting grown plants, will be planted in the 'seed orchard' at Werribee Zoo. This is a proposed main feature with a specific role of providing propagation material of rare and endangered grassland species to relevant environmental institutions whether they be government or community based.

Although our exercise in propagation was not a

scientific experiment with the necessary controls, we have concluded that the emu's stomach acids neutralise the germination inhibitors more effectively than leaching in water. The decline of *Eremophila desertii* on the volcanic western plains of Victoria may be, just may be, due to the disappearance of the emu from those same plains.

It takes two to tango in a symbiotic relationship!!!



K Road, Werribee,
P.O. Box 274, Werribee,
Victoria, 3030. Australia

Waterlily Crisis

Nita Lester, Director,
Myall Park Botanic Garden,
Glenmorgan Qld

It has worried the Directors of Myall Park Botanic Garden Ltd for a number of years that the numbers of the pink flowering waterlily, *Nymphaea gigantea*, have decreased.

In 1968 Mr David Gordon and Mr Rob Lethbridge saved the *Nymphaea gigantea* var. *nerososa*, now extinct in nature, by planting two adult plants in a dam on Mr Gordon's property. The original site, Undulla Creek, north of Meandarra, was silting up and the lilies were dying. Within a few years the pink waterlily was

flourishing in its new home.

However, photographs taken over the past 12 years or so show proof that the waterlily population is decreasing at an alarming rate. These concerns were discussed with and confirmed by a visiting world aquatic expert, Dr Walter Paigel, from America.

There were a number of physical and chemical factors contributing to this finding: the number of flowers and lily pads had decreased, the water was very smelly with a high percentage of decomposing matter, light penetration was greatly reduced, and there were a high percentage of ethanes in the mud substrate. Along with these findings, the population of *Nymphoides crenata* (Wavy Marshwort), which in the past had grown in the shallows of the dam, was now growing vigorously at depths previously occupied by the waterlily.

The *Nymphoides crenata* species growing here displays physical features and habit that vary from the general descriptions given in botanical books, and this was confirmed by Dr Paigel.

It was suggested that the relocation of some of the pink waterlilies would be advisable this spring and the eradication of the aggressive *N. crenata* be investigated.

Assistance with our problems is required. Would any readers have experience dealing with this aggressive form of *Nymphoides*? What procedure would you suggest? What could be the reasons for this change in the waters of the dam? Land use around and in the water catchment of the dam has not changed. Water levels have varied fairly

consistently since 1968 so there are no sudden changes in that regard. No other water plants have been introduced or removed. Bird numbers have always been few, as the dam is in full sunlight and there is an absence of tall trees nearby for protection.

Please contact Nita C Lester, "Talbragar", Glenmorgan Qld 4423 if you have any suggestions.

Electronic Addresses

Canadian Botanical Conservation Network

<http://www.science.mcmaster.ca/Biology/CBCN/en/>

Olive Pink Botanic Gardens

<http://www.anbg.gov.au/pink/opgarden.html>

AMENET: Internet address for environmental managers

Established through the Office of the Supervising Scientist. You can subscribe with an email message to:
majordomo@oss.erin.gov.au.

Leave the subject line blank, and write into the message body:
subscribe AMENET
end.

Society for Growing Australian Plants On-line Newsletter, "Australian Plants online"

<http://www.ozemail.com.au/~sgap/apoline.html>

Regional Groups

South West Slopes Region

**Report of the Meeting held
Saturday 24th August 1996
at Illabo**

*Paul Scannell, Albury Botanic
Gardens*

The first on-site meeting of the South West Slopes Region was held at a fantastic roadside remnant site, about five kms long, on the Illabo-Wantiool Rd. Around 35 people attended, including local landholders, National Trust representatives, Canberra members and Wagga Landcare people. A leisurely, informative stroll was followed by a bbq lunch and a lengthy chin wag. Congratulations to Mark Sheahan, Owen Whittaker and Will Howard for their great organisation and supply of information to all.

The day was spent identifying species, with several species represented by only one or two individual plants. This included a variety of *Cryptandra amara*. The variation in the vegetation along the roadside was a great example of how different soil types and management practices determine the predominant species. The local landholders were a great source of information and their cooperation in preventing grazing of the site was very encouraging.

A species list already compiled had more species added to it as we strolled, with

new species found on each of the last three occasions and this will be put on a database at the Albury Botanic Gardens.

The information for this database will come from our site registration form, adapted from the Olympic Way Roadside Assessment Sheet, kindly supplied by Fleur Stelling. With a few minor adjustments the sheet will be able to be used by other groups for vegetation mapping and fauna surveys.

By supplying this site register form to all local Landcare groups and other interested parties, and with input from our on-site meetings, we hope to have a register of all the sites in the South West Slopes region to enable monitoring and management decisions to be as efficient as possible.

Next Meeting

This was planned for Saturday September 22nd at 'Yallock', the property of Roger and Margaret Geddes, Four Mile Lane, 17 kms north of Holbrook. It was to be a joint venture with SGAP, Greening Australia, Holbrook Landcare and the Department of Land and Water Conservation.

A report on this meeting will appear in the next issue of *Danthonia*.

(Note from the editor: Paul is keen to hear from anyone who has developed methods for assessing and registering remnant vegetation. He can be contacted on:

Phone: (060) 238 241.

Fax: (060) 416 527).

Central Western Slopes Region Inaugural Meeting

If you live in the Central Western Slopes region of NSW, please come along to the inaugural meeting of this new Regional Group.

Place: Burrendong Arboretum, Tara Rd, Mumbil via Wellington NSW.

Date: 12 October 1996.

Time: Arrive by noon Saturday for lunch, provided at \$7.00.

There will be an introduction from Jeanette Mill, the ANPC National Coordinator, and discussion of the roles, goals & direction of the ANPC & the group, etc.

RSVP by 8th October 1996 to Bob Waters, Burrendong Arboretum, Tara Rd, Mumbil via Wellington NSW.

Phone/fax: (068) 467 454.

Victorian Region

Early in December the Victorian Regional Group will be holding a one-day seminar/workshop.

Where: At Melbourne Zoo.

Main topic: 'Corridors and Associated Plant Conservation Issues'. There will be a variety of speakers and a number of topics will be covered.

Details will be sent out in invitations to all Victorian Region members.

For further information, contact: John Arnott, Melbourne Zoo.

Phone: (03) 9285 9436.

You can also contact Dale Tonkinson, Greening Australia.

Phone: (03)9457 3024.

Sydney and SENSW Regions

Report on the Joint Meeting at the Wollongong Botanic Garden, 10 August 1996

Steve Popple, Wollongong
Botanic Garden

About 25 members attended the meeting at the Education Centre, Wollongong Botanic Garden. It was encouraging to see such a good turnout, with some members from the SENSW / ACT Region attending.

Paul Formosa, the Natural Areas Officer from Wollongong City Council, spoke about the Council's Bushcare program. This is a community based program, where volunteer groups adopt an area of bushland and work towards its restoration. Paul outlined the strategy behind the Bushcare program and detailed the framework in which community groups operate. Sponsorship of Bushcare by McDonalds was of particular interest to several members and much discussion followed. Paul explained the benefits of having local communities involved in management and restoration of remnant vegetation, particularly when these areas are beyond the resources of the Council to maintain.

The second speaker was Ray Brown from the Illawarra Grevillea Park. Ray outlined the development and progress to date at the Park and the future directions of plantings. He emphasised that it was only by donations of

machinery and materials by local business that the Park was able to develop as rapidly as it had, and that public organisations could tap into these resources when developing new facilities.

Lunch was catered by Chris and Rona Wareing, and was enjoyed 'al fresco' on the lawn outside the Education Centre. Afterwards the group decided to visit the Grevillea Park, no doubt inspired by Ray's talk. A brilliant display of grevilleas and hakeas in flower greeted members at the entrance gate. Some of the grafted Western Australian species were of interest. After an all too brief visit the group set off again to inspect the site of *Pterostylis gibbosa* at Yallah.

Miraculously everyone seemed to arrive at the location intact and on time. A short introductory talk by Graeme Bradburn, the Conservation Officer from the Australasian Native Orchid Society, outlined the history of the site and current management practices. Everyone then gingerly inspected the site, trying carefully not to step on the plants which grow amongst low grass. Graeme pointed out that research is currently being undertaken by the University of Wollongong into the plant's biology, and explained factors which cause seasonal fluctuations in species numbers.

The tour generated a lot of discussion which continued for some time after the group returned to the vehicles. Many thanks to all those people who helped make the day a success.

Next Sydney Region Meeting

When: 10.30 am, 16th
November 1996.

Where: Theatrette, NSW
NPWS Heritage Centre,
Blackheath.

The day includes reports on threatened species recovery plans, and several field trips.

Lunch is a fundraiser for the WildPlant Rescue Service.

Please RSVP to Ben Correy well in advance, c/- NSW NPWS Blackheath.

Phone: (047) 87 8877.

Fax: (047) 87 8514.

More details will be available in the invitations.

Group Coordinator: Tracey
Armstrong, Mt Annan Botanic
Garden.

Phone: (046) 48 2477.

Fax: (046) 48 2465.

Next SENSW/ACT Meeting

When: 10am Saturday 19th
October 1996.

Where: Theatrette,
Australian National Botanic
Gardens, Canberra and Lake
Burley Griffin for a bbq lunch.

Talk: "Defining research priorities for achieving practical conservation outcomes: lessons from the cases of *Haloragodedron lucasii*, *Zieria prostrata* and *Wollemia nobilis*". The guest speaker will be Dr Rod Peakall, Lecturer at the Australian National University.

Meeting: an issues session and discussion on the program.

Details will be sent in the invitations.

**Please RSVP by 11th
October 1996** to the Group's
Coordinator, John Wilkes.

Phone: (06) 238 2490.

Email: widgiewa@msn.com

**The Australian Network
For Plant Conservation
Membership List**

The date (1995/6) indicates that the member has joined or renewed for that year. Addresses and names of contact persons are available from the National Office.

Corporate Members

ACT Parks & Conservation Service, (1996)
Adelaide Botanic Gardens (1997)
Albury Botanic Gardens, NSW (1996)
Alcoa of Australia Ltd, WA (1996)
Australian Army (1995)
Aust Tree Seed Centre, CSIRO (1996)
Australian National Botanic Gardens (1996)
Aust. Nature Conservation Agency (1996)
Barcaldine Shire Council, Qld (1996)
Bremer Inst. of TAFE, Qld (1996)
Centre for Plant Biodiversity Rsch, ACT (1996)
City of Frankston, Vic (1995)
Coffs Harbour City Council, NSW (1997)
Conservation & Land Management, WA (1995)
CSIRO, Division of Plant Industry (1995)
CSIRO Publishing (1996)
Eurobodalla Bot Garden, NSW (1997)
Flecker Botanic Gardens, Qld (1997)
Forestry Tasmania (1996)
George Caley Botanic Garden, NSW (1995)
Gladstone Tondoon Botanic Garden, Qld (1997)
Kings Park and Botanic Gardens, WA (1996)
LWRRDC, ACT (1996)
Logan City Council Libraries, Qld (1996)
Minerals Council of Aust, ACT (1996)
Mt Coot-tha Botanic Gardens, Qld (1996)
Norfolk Island Botanic Garden (1996)
North Forest Products, Tas (1996)
NSW National Parks & Wildlife Service, (1996)
Parks and Wildlife Commission of the NT (1996)
Parks Wildlife and Heritage, Tas (1996)
Queensland Herbarium (1996)
Randwick City Council, NSW (1995)
RGC Mineral Sands, WA (1996)
Royal Botanic Gardens, Melbourne, Vic (1996)

Royal Botanic Gardens, Sydney, NSW (1996)
Royal Tasmanian Botanical Gardens (1997)
Royal Zoological Society of SA (1996)
Standing Committee on Forestry, ACT (1995)
Townsville City Council (1997)
Transgrid Sydney, NSW (1996)
Transgrid - Yass, NSW (1996)
Wollongong Botanic Gardens (1996)
Zoological Parks Board of NSW (1996)
Zoological Board of Victoria (1996)

International Associates

Botanic Gardens Conservation Intl, UK
Botanical Research Institute of Texas
Canadian Botanical Conservation Network
Center for Plant Conservation, USA
David Given, NZ
Honiara Botanic Gardens, Solomon Islands
Indian Society for Conservation Biology
Indonesian Network for Plant Conservation
Clive Jermy
Kebun Raya Indonesia
Noelline Kroon, South Africa (1996)
Missouri Bot. Gardens Library (1996)
National Botanical Institute, South Africa
PlantNet, UK
Rare Plant Consortium, Canada
Royal Botanic Gardens, Kew, UK (1996)
Society for Ecological Restoration, USA
Suva Botanical Gardens, Fiji
Vailima Botanic Gardens, Western Samoa
Wellington Plant Conservation Network

Other Organisations

Assn. of Soc. for Growing Aust Plants (1996)
Australian Arid Land Botanic Garden, SA (1996)
Aust Assn. of Bush Regenerators (1995)
Aust. Trust for Conservation Volunteers (1995)
Brunswick Valley Heritage Park, NSW (1996)
Burrendong Arboretum Trust, NSW (1996)
Community Biodiversity Network (1996)
Cotter Parkcare Group, ACT (1996)
Deakin Uni, Rusden Campus Library, Vic (1995)

Friends of Grasslands, ACT (1995)
Friends of North Coast Regional BG, NSW (1996)
Greening Australia (ACT) (1996)
Greening Australia (NSW) (1996)
Greening Aust (NSW) Education (1995)
Greening Australia (Vic) (1996)
Greening Western Australia (1996)
Hunter Region Botanic Gardens, NSW (1996)
Illawarra Zoological Society, NSW (1995)
Indigenous Flora & Fauna Assn (1996)
Macksville High School (1995)
Myall Park Botanic Garden, Qld (1996)
National Threatened Species Network (1996)
Network of Reg Bot. Gdns, Qld (1996)
Olive Pink Arid Zone Botanic Garden, NT (1995)
Pangarinda Arboretum, SA (1996)
Royal Aust Institute of Parks & Recreation (1995)
Royal Geographical Society of Qld (1996)
SGAP Blue Mtns Group, NSW (1996)
SGAP - Canberra Region Inc (1996)
SGAP - Dryandra Study Group (1996)
SGAP - East Hills Group, NSW (1995)
SGAP - Far Nth Coast Gp, NSW (1996)
SGAP - Grampians Group, Vic (1995)
SGAP - Hobart District Group (1996)
SGAP - Ipswich Branch, Qld (1995)
SGAP - Maroondah Inc, Vic (1996)
SGAP - New South Wales Ltd (1996)
SGAP - Newcastle, NSW (1997)
SGAP - North Shore, NSW (1996)
SGAP - Northern Group, Tas (1996)
SGAP - North West, Tas (1996)
SGAP - Queensland Region (1996)
SGAP - Southside, Qld (1995)
SGAP - South West Slopes, NSW (1996)
SGAP - Tasmania Region (1996)
Stony Range Flora Reserve, NSW (1995)
Sunraysia Oasis Botanic Gardens (1996)
Tasmanian Arboretum Inc (1996)
Trust for Nature (Victoria) (1996)
Understorey Network, Tasmania (1996)
Wallum Action Group, Qld (1996)
Wildflower Society of WA (1995)
Wildflower Soc. of WA - Mandurah (1995)
Wildflower Society of WA, Nth Suburbs (1996)
World Wide Fund for Nature Australia (1997)

Individual Members

- Dr David Aldous, Vic (1996)
Ian Anderson, ACT (1997)
Margaret Bailey, NSW (1996)
Greg Bain, Vic (1995)
Bee & Bill Barker, Vic (1996)
Clive Barker, NSW (1996)
Tim Barlow, Vic (1996)
Robert Barnes, NSW (1996)
Peter Barrer, ACT (1996)
Stephen Barry, Qld (1995)
Brett Beecham, Vic (1996)
Stephen Bell, NSW (1996)
John Benson, NSW (1996)
Megan Bermingham, NSW (1996)
Robert Blackall, NSW (1996)
Dhyan Blore, NSW (1995)
Dr Robert Boden, ACT (1996)
Elizabeth Boesel, NSW (1996)
Dr Barbara Briggs, NSW (1997)
Dr AHD Brown, ACT (1996)
Douglas Brown, Tas (1996)
Louise Bull, NSW (1996)
Richard Burns, Tas (1996)
Dr G Burrows, NSW (1996)
Geoff Butler, NSW Hon. Life Member
Geoff Carr, Vic (1997)
Mary Cawte, NSW (1996)
Calder Chaffey, NSW (1996)
Irene Champion, Qld (1996)
John Clark, ACT (1995)
Anne Coates, WA (1996)
Fiona Coates, Vic (1996)
Anne Cochrane, WA (1997)
Jon Cole, NSW (1996)
Ben Correy, NSW (1996)
Russell and Sharon Costin (1995)
Jennifer Cowie, NSW (1995)
Ian Cox, NSW (1996)
Isobel Crawford, ACT (1996)
Simon Cropper, Vic (1996)
L Cusack, NSW (1996)
Richard Davies, SA (1995)
John Delpratt, Vic (1995)
Egon Demuth, NSW (1996)
Susan Denham, NSW (1995)
Ross Dolg, NSW (1997)
Stuart Donaldson, ACT (1996)
Wendy Dossetor, ACT (1996)
Alison Elvin, ACT (1995)
Elizabeth Fenton, Vic (1996)
Paul Field, SA (1996)
Lance FitzGerald, NSW (1996)
Paul Foreman, Vic (1997)
Julie Foster, ACT (1996)
Bill Gale, NSW (1996)
Elizabeth George, WA (1996)
Lill Gillan, Vic (1996)
Kaye Glennon, WA (1996)
Roger Good, ACT (1996)
Dave Gordon, Qld (1996)
Dr Janet Gorst, Qld (1996)
Robert Gourlay, ACT (1996)
Matthew Gray, NSW (1995)
Joanne Green, NSW (1995)
Helen Grey-Smith, NSW (1995)
Sandra Griffith, Qld (1996)
Barrie Hadlow, ACT (1996)
Roger Hart, Christmas Is. (1996)
Tim Hayes, NSW (1996)
John R Hayter, Qld (1995)
Els Hayward, Tas (1996)
Michael Healey, NSW (1996)
Jill Hickie, Tas (1995)
Mrs S Hyne, NSW (1996)
Greg Jackson, NSW (1996)
Amanda Johnson, NSW (1996)
Kerry Jones, Vic (1996)
Alison Kelly, NSW (1995)
Van Klaphake, NSW (1997)
Heather Knowles, Qld (1996)
Patty Kolln, NSW (1996)
Jill Landsberg, ACT (1996)
Gary Leonard, NSW (1996)
John Litchfield, ACT (1996)
Vicki Long, WA (1996)
Bill McDonald, Qld (1996)
Tien McDonald, NSW (1996)
Alex Mackenzie, NSW (1996)
R D Maher, Qld (1995)
David Mason, NSW (1996)
Maria Matthes, NSW (1996)
Stephen Mattingley, ACT (1995)
Lyn Meredith, ACT Hon Life Member
Tammy Mills-Thom, NSW (1996)
Geoffrey Mitchell, NSW (1996)
Judith Moffatt, Qld (1995)
Bryan Mole, Vic (1996)
Lorna Murray, Qld (1996)
Sharon Nash, NSW (1996)
Robyn Newman, NSW (1995)
Nan Nicholson, NSW (1996)
Alexander Nicol, NSW (1995)
Henry Nix, ACT (1996)
Ivana Noell, Qld (1995)
Brett O'Donovan, NSW (1996)
Jacqui O'Grady, Qld (1995)
Peter Olde, NSW (1995)
Joan Overeem, NSW (1996)
Matthew Oxford, SA (1995)
Dr. Bob Parsons, Vic (1996)
Hugh Paterson & Françoise Matter, NSW (1996)
Plantique, NSW (1996)
J Playford, Qld (1996)
Tim Powe, ACT (1996)
Klaus Querengasser (1996)
Brian Quinn, Vic (1996)
Frances Quinn, NSW (1996)
Murray Ralph, Vic (1995)
Peter Ray, WA (1997)
Ruth Readford, NSW (1996)
Phil Redpath, NSW (1996)
Dorothy Redreau, WA (1996)
Bonni Reichelt, Qld (1996)
Mark Richardson, NT Hon. Life Member
Brett Robinson Qld (1996)
Esma Salkin, Vic (1996)
Alison Shapcott, NT (1996)
Sarah Sharp, ACT (1996)
Mark Sheahan, NSW (1996)
Howard Smith, NSW (1995)
Marilyn Smith, NSW (1996)
John Smyth, NSW (1997)
Diana Snape, Vic (1996)
Fiona Spiers-Ashcroft, ACT (1996)
John & Irene Story, Qld (1996)
Joe Swartz, NSW (1996)
Jane Tarran, NSW (1996)
Nicki Taws, ACT (1996)
Roy Taylor, USA (1996)
Technical Librarian, Qld (1995)
Lyn Thompson NSW (1995)
Jan Tilden, Qld (1995)
Vivienne Turner, Vic (1995)
Bindi Vanzella, NSW (1996)
John Virtue, SA (1995)
Dierk von Behrens, ACT (1996)
Sue & Warner Wait, Tas (1996)
Josephine Walker, NSW (1996)
Bruce Wannan, Qld (1996)
Chris Ward, NSW (1995)
Matt White, Vic (1996)
John Wilkes/Ros Cornish, NSW (1996)
Jann Williams, ACT (1996)
Mark Williams, NSW (1995)
ME Williams, Qld (1995)
J & A Willinck, NSW (1996)
Anne-Marie Wilson, ACT (1996)
Brigitta Wimmer, NSW (1996)
John Wrigley, NSW (1996)
Martin Zierholtz, NSW (1996)

Donations Received from:

- EA George (1996)
Plantique, NSW (1996)
Martin Zierholtz, NSW (1996)